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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,323	10/31/2003	Mark Buehler	ITL.1025US (P16712)	9811
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TROP PRUNER & HU, PC 1616 S. VOSS ROAD, SUITE 750 HOUSTON, TX 77057-2631			EXAMINER RIGGLEMAN, JASON PAUL	
			ART UNIT 1792	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/698,323	<b>Applicant(s)</b> BUEHLER, MARK	
	<b>Examiner</b> JASON P. RIGGLEMAN	<b>Art Unit</b> 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 December 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Status of Claims*

1. Applicant's reply filed on 12/27/2007 is acknowledged. Current pending claims are 1-23. Claims 24-34 are canceled. No claims are currently amended.

### *Response to Arguments*

2. Applicant's arguments, filed 12/27/2007, with respect to the rejections of claims over Wang et al. (US Patent Application Publication No. US 2002/0077035) and Andros (US Patent No. 6033486) have been fully considered and are not persuasive. All previous rejections are maintained.

3. The applicant argues that Wang et al. fails to teach attaching ligands along a polymer bristle – because the “ligand is attached to a polymer bristle which necessarily must already have been formed”. Examiner disagrees – the claims read on a brushing surface (bristle) which can be formed *simultaneously* with the ligand attachment. Regardless, Wang et al. teaches the use of “a complexing or chelating ion exchange resin is one that has at least one ligand **bound** to a polymer matrix and where the ligand can complex, chelate”, paragraph [0035]. The method of attaching a ligand to a resin is **inherently** taught from the structure of a ligand **attached** to the polymer matrix (in forming the resin). Furthermore, the specifics are taught in paragraphs [0039]-[0040] which teaches derivatization with functional groups (ligands) of the resins post-polymerization. Clearly, if a ligand is attached to the polymer in forming the exchange resin and the resin is used to form a brush --- then the attachment of ligands along a bristle is suggested. Further, the ion exchange resin may be formed in the shape of a

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fiber – suggesting a bristle, paragraph [0037]. The applicant appears to wish a special definition for “attaching”. See definition below ([www.dictionary.com](http://www.dictionary.com)):

*American Heritage Dictionary - Cite This Source - Share This*

at·tach (ə-täch')

v. at·tached, at·tach·ing, at·tach·es

v. *tr.*

1. To fasten, secure, or join: *attached the wires to the post.*
2. To connect as an adjunct or associated condition or part: *Many major issues are attached to this legislation.*
3. To affix or append; add: *attached several riders to the document.*
4. To ascribe or assign: *attached no significance to the threat.*

4. The applicant argues that Andros fails to teach cationic ligands. Firstly, Examiner does not understand what rejected claims the applicant is arguing against. Nevertheless, the applicant argues that since cationic elements 42 and 43 are cross-linked they are; therefore, part of the plastic that forms the sponge and cannot be considered to be attached to the brush. Applicant states, the "internal plastic structure of the sponge is made cationic". Examiner does not understand what the applicant means by "internal plastic structure" -- be it molecular, subatomic, or macroscopic surface features. As stated above, the claims read on a brushing surface (bristle) which can be formed *simultaneously* with the ligand attachment. Secondly, the claims do not require that the ligands are on the “exterior” surface of the bristle and **not** the interior. Examiner asserts --- the applicant's arguments are not persuasive.

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5. The applicant argues that Andros “certainly” fails to teach ligands (since “elements” 42 and 43 are admitted to be cationic) and that “nothing in Wang suggests any kind of ligand” --- Examiner **points** to paragraph [0035] of Wang et al. Once again, the applicant argues for a special definition of ligand not contained in the original disclosure. The applicant argued previously that a ligand is “any molecule, ion, or group bound to the central atom in a chelate or coordination compound” and that a “ligand involves a coordination compound with involves a metal central atom or molecule”. The examiner disagrees with this special and narrow definition. The term “ligand” is generic. See the definition below (www.dictionary.com):

*American Heritage Stedman's Medical Dictionary -- Cite This Source -- Share This*

li·gand (lī'gənd, lĭg'ənd)

*n.*

An ion, a molecule, or a molecular group that binds to another chemical entity to form a larger complex.

### ***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. This claim is not understood. How does a ligand attachment change a zeta-potential? Further, what zeta-potential is being changed?

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 1, 5, 9-10, 13, 15, and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. (US Patent Application Publication No. US 2002/0077035).

10. Wang et al. teaches a semiconductor cleaning pad with a polymer (ion exchange material) scrubbing element having a plurality of fixing ligands capable of complexing/chelating materials, paragraphs [0008] and [0078]. The ion exchange materials has electrically charged groups (ligands) capable of forming complexes with anion or cations; therefore, changing the zeta-potential (surface charge) to positive or negative is inherently taught, paragraph [0035]. Also, it is inherent that a polymeric material that functions to complex cations or anions is hydrophilic due the polarity of the surface. Wang et al. suggests the use of a brush, paragraph [0078].

11. In regards to claim 1, Wang et al. does not teach the use of a cleaning brush with bristles; however, it has been held that an obvious choice in design is not patentable (*In re Kuhle* 188 USPQ 7). Wang et al. suggests the use of a brush, paragraph [0078]. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Wang et al. to make a method of cleaning with a bristled brush to achieve the expected result.

12. *Note: the claims read on a brushing surface (bristle) which can be formed simultaneously with the ligand attachment. Wang et al. teaches the use of "a complexing or chelating ion exchange resin is one that has at least one ligand bound to a polymer matrix and where the ligand can complex, chelate", paragraph [0035]. The method of attaching a ligand to a resin is inherently taught from the structure of a ligand attached to the polymer matrix (in forming the resin). Furthermore, the specifics are taught in paragraphs [0039]-[0040] which teaches derivatization with functional groups (ligands) of the resins post-polymerization. Clearly, if a ligand is attached to the polymer in forming the exchange resin and the resin is used to form a brush --- then the attachment of ligands along a bristle is suggested. Further, the ion exchange resin may be formed in the shape of a fiber – suggesting a bristle, paragraph [0037].*

13. Claims 1, 3-20, and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andros (US Patent No. 6033486).

**14.** Andros teaches a method for attaching cationic ligands along a polyvinyl alcohol polymer bristle of a sponge, Fig. 4, to form a semiconductor cleaning sponge (Column 7, Lines 44-51). A coupling agent (epoxide 2,3-epoxytrimethylammonium chloride) is used to attach the positively charged ammonium ligand (Column 5, Lines 0-10). The cationic ligands are hydrophilic and provide attraction to a specific material– specifically particles of negative zeta-potential (Column 7, Lines 63-67) (Column 2, Lines 61-67). Andros teaches attaching a ligand having a subchain to the polymer – Fig. 3 – note bonded carbon atom 44 linking polymer chain 42 to subchain 43. The ligand can be considered the crosslinked polymer in Fig. 3; therefore, having a two carbon minimum

subchain length. The subchain is provided with a moiety – ammonium ligand – providing a property to the ligand. The cationic ligand is necessarily providing one of the three properties --- inert, reducing, or oxidizing depending on the medium and the chemical species in question – it may be any of the three and is not independent of the cleaning solution and particles and contaminants contained therein. It should be noted that polyvinyl alcohol is soluble in water – the cross-linking of the polymer forms the microsp sponge which is insoluble, also the degree of cross-linking (or ligand attachment to the backbone) determines the hydrophobicity (Column 4, Lines 0-65). Note: the claims read on a brushing surface (bristle) which can be formed *simultaneously* with the ligand attachment. Secondly, the claims do not require that the ligands are on the “exterior” surface of the bristle and **not** the interior.

15. In regards to claim 1, Andros does not teach the use of a cleaning brush with bristles; however, it has been held that an obvious choice in design is not patentable (*In re Kuhle* 188 USPQ 7). Andros suggests the use of a brush, paragraph [0078]. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Wang et al. to make a method of cleaning with a bristled brush to achieve the expected result.

16. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Andros (US Patent No. 6033486), as applied to claim 1 above, and further in view of Sau (US Patent No. 5036137).

17. Andros teaches a method for attaching cationic ligands along a polyvinyl alcohol polymer bristle of a sponge, Fig. 4, to form a semiconductor cleaning sponge (Column



7, Lines 44-51). A coupling agent (epoxide 2,3-epoxytrimethylammonium chloride) is used to attach the positively charged ammonium ligand (Column 5, Lines 0-10). The cationic ligands are hydrophilic and provide attraction to a specific material— specifically particles of negative zeta-potential (Column 7, Lines 63-67) (Column 2, Lines 61-67). Andros teaches attaching a ligand having a subchain to the polymer – Fig. 3 – note bonded carbon atom 44 linking polymer chain 42 to subchain 43. The ligand can be considered the crosslinked polymer in Fig. 3; therefore, having a two carbon minimum subchain length. The subchain is provided with a moiety – ammonium ligand – providing a property to the ligand. The cationic ligand is necessarily providing one of the three properties --- inert, reducing, or oxidizing depending on the medium and the chemical species in question – it may be any of the three and is not independent of the cleaning solution and particles and contaminants contained therein. It should be noted that polyvinyl alcohol is soluble in water – the cross-linking of the polymer forms the microsp sponge which is insoluble, also the degree of cross-linking (or ligand attachment to the backbone) determines the hydrophobicity (Column 4, Lines 0-65).

18. In regards to claim 1, Andros does not teach the use of a cleaning brush with bristles; however, it has been held that an obvious choice in design is not patentable (*In re Kuhle* 188 USPQ 7). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Andros to make a method of cleaning with a bristled brush to achieve the expected result.

19. In regards to claim 2, Andros, as modified above, teaches the addition of a ligand to a PVA bristle to effectively clean hydrophobic particles; however, Andros does not

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teach a hydrolysis reaction. Sau teaches the modification of polyvinyl alcohol polymer (naturally water soluble) with a silane coupling agent (which adds via a hydrolysis reaction) to effect cross-linking or to functionalize the polymer backbone with various ligands – effecting hydrophobicity (Column 2, Lines 25-68). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Andros, as modified above, with Sau to create an effective polymer bristle for removing hydrophobic particles from wafers.

### ***Conclusion***

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Culkins et al. (US Patent No. 5937469) teaches a brush with bristles for cleaning semiconductor wafers.

21. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON P. RIGGLEMAN whose telephone number is (571)272-5935. The examiner can normally be reached on M-F, 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael Barr/  
Supervisory Patent Examiner, Art Unit 1792

Jason P Riggleman  
Examiner  
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JPR